Customer No.: 07278

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	Lewis COLMAN
Serial No.:	10/009,845
Filed:	March 27, 2002
For:	INFRA-RED LIGHT SOURCE
Group Art Unit:	2879
Examiner:	German Colón.
Attorney Docket:	06727/000K097-US0

Hon. Commissioner of Patents and Trademarks,
P.O. Box 1450,
Alexandria, VA 22313-1450

June 21, 2005.

APPEAL BRIEF

(1) Real Party in Interest

The subject application is owned by Oridion Medical (1987) Ltd., an Israel Company having a place of business at P.O. Box 45025, Jerusalem 91450, Israel. The assignment was recorded in the U.S.P.T.O. on April 4, 2003, at Reel 013923, Frame 0527.

(2) Related Appeals and Interferences

Neither the appellant, nor the appellant's legal representative, nor the assignee are aware of any other appeal or interference related to the present appeal brief.

(3) Status of Claims

On January 21, 2005, the appellant appealed from the final rejection in the Office Action dated September 21, 2004, of claims 1-17 of the application.

(4) Status of Amendments

Subsequent to final rejection, the appellant has not filed any claim amendment.

(5) Summary of Invention

Appellant's invention comprises an improved electrically excited gas discharge lamp containing a gas mixture comprising at least one IR-active gas species, which, when excited, provides an output characteristic of spontaneous emission to a ground state. The improvement comprises the inclusion within the lamp envelope of a catalytic material deposited in finely divided form.

The invention also comprises methods of constructing improved, electrically excited, gas discharge lamps by the inclusion within the lamp envelope of a catalytic material deposited in finely divided form.

The lamp of the appellant's invention differs from prior art lamps by the inclusion of the catalytic material. This provides the lamp of the present invention with a number of improved properties, the most basic being that of increased spectral stability. Further improved properties are those of decreased lamp volume and decreased gas fill concentration, the latter property providing, when the emission spectrum of the lamp is used in a gas analyzer, absorption lines of increased depth.

Claim 1 is an independent claim directed to a method of constructing an improved, electrically excited, gas discharge lamp. The claimed method comprises the following steps:

(a) constructing a lamp envelope;

(b) cleaning the lamp envelope;

(c) filling the envelope with a gas mixture comprising at least one IR-active gas species, the gas species being such that the lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited; and

(d) including a catalytic material deposited in finely divided form within the lamp envelope.

The method is described in the specification of the present patent application and in the drawing according to the references in Table 1 below.

Claim 5 is an independent claim directed to a method of constructing an improved, electrically excited, gas discharge lamp. The claimed method comprises the following steps:

(a) constructing a lamp envelope;

(b) cleaning the lamp envelope;

(c) filling the envelope with a gas mixture comprising at least one IR-active gas species, the gas species being such that the lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited; and

(d) including a catalytic material deposited in finely divided form within the lamp envelope such that the volume of the lamp can be decreased.

The method is described in the specification of the present patent application according to the references in Table 1 below.

Claim 7 is an independent claim directed to a method of constructing an improved, electrically excited, gas discharge lamp. The claimed method comprises the following steps:

(a) constructing a lamp envelope;

(b) cleaning the lamp envelope;

(c) filling the envelope with a gas mixture comprising at least one IR-active gas species, the gas species being such that the lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited; and

(d) including a catalytic material deposited in finely divided form within the lamp envelope such that the IR-active gas concentration can be decreased.

The method is described in the specification of the present patent application according to the references in Table 1 below.

Claim 10 is an independent claim directed to an electrically excited gas discharge lamp. The lamp comprises the following elements:

(a) a lamp envelope containing a gas mixture comprising at least one IR-active gas species;

(b) electrodes external to the envelope for exciting the at least one IR-active gas species, the gas species being such that the lamp provides an output characteristic of spontaneous emission to a ground state; and

(c) a catalytic material deposited in finely divided form, located within the lamp envelope.

The lamp is described in the specification of the present patent application and in the drawing according to the references in Table 1 below.

The remaining claims are all dependent claims, as follows:

Dependent claims 2-4, 8-9 and 17 depend directly or indirectly from independent claim 1.

Dependent claims 6 and 15 depend directly from independent claim 5.

Dependent claim 16 depends directly from independent claim 7.

Dependent claims 11-14 depend directly from independent claim 10.

TABLE 1

Claim	Support in specification according to page and line	Fig. No. (with reference numbers if relevant)
1 (indep.)	p. 7, first paragraph; p. 9, paragraph 3, lines 6-9.	Fig. 1, ref. 26.
2 (dep. from 1)	p. 10, paragraph 2, lines 6-8.	
3 (dep. from 1)	p. 10, paragraph 1, line 3.	Fig. 1, ref. 26.
4 (dep. from 1)	p. 8, paragraph 6.	
5 (indep.)	p. 7, paragraph 3; p. 10, paragraph 3, bridging p. 11.	
6 (dep. from 5)	p. 11, first paragraph, lines 1-2.	
7 (indep.)	p. 8, first paragraph, lines 1-2; p. 11, paragraph 2.	
8 (dep. from 1)	p. 2, paragraph 5, line 3; p. 8, paragraph 5, lines 2-3.	
9 (dep. from 1)	p. 8, paragraph 5, lines 3-4; p. 11, paragraph 2, lines 5-7.	
10 (indep.)	p. 9, paragraph 4, bridging p. 10.	Fig. 1.
11 (dep. from 10)	p. 7, first paragraph, lines 5-6; p. 10, paragraph 2, lines 6-8.	
12 (dep. from 10)	p. 10, paragraph 1, line 3.	Fig. 1, ref. 26.
13 (dep. from 10)	p. 8, paragraph 6.	
14 (dep. from 10)	p. 2, paragraph 5, line 3; p. 8, paragraph 5, lines 2-4.	
15 (dep. from 5)	p. 8, paragraph 5, lines 2-3.	
16 (dep. from 7)	p. 8, paragraph 5, lines 3-4.	
17 (dep. from 9)	p. 4, para. 2 to p. 5, para. 4 for explanation. p. 11, paragraph 2, lines 9-11.	

(6) Issues

Claims 1-17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yatsiv et al. (US 5,300,859) in view of Kaminski et al. (US 4,547,886).

The Examiner's rationale is stated as follows in his final rejection dated September 21, 2004:

" Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yatsiv et al. (US 5,300,859) in view of Kaminski et al. (US 4,547,886).

Regarding claims 1 and 10, Yatsiv discloses a method of constructing an electrically excited gas discharge lamp (see Figs. 1, 3 and 4), comprising the steps of:

constructing a lamp envelope;

cleaning said lamp envelope; and

filling said envelope with a gas mixture comprising at least one IR-active gas species (i.e. CO_2), said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited (see at least Col. 2, lines 6-18). Yatsiv is silent regarding the limitation of including a catalytic material within said lamp.

However, in the same field of endeavor, Kaminski discloses a discharge lamp comprising a catalytic material deposited in finely divided form within the lamp envelope in order to reduce arcing between electrodes and loss in optical power, resulting from the decomposition of CO_2 into CO and oxygen (see Col. 1, lines 14-20; and Col. 2, lines 21-25, and 35-37). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the catalytic material of Kaminski in the gas discharge of Yatsiv, with the purpose of reducing arcing between electrodes and loss in optical power, resulting from the decomposition of CO_2 into CO and oxygen.

The Examiner notes that while Kaminski refers to a an IR-laser, instead of an IR-lamp which provides an output characteristic of spontaneous emission to a ground state, the problem of decomposition or dissociation of CO_2 to CO and oxygen is found on both IR-sources, and thus, one of ordinary skill in the art would entertain the idea of using the teachings of Kaminski in an IR-lamp. See at least GB Patent No.1 591 709 to Webley as evidence of the problem of CO_2 dissociation in IR -discharge lamps.

Regarding claims 2 and 11, Yatsiv-Kaminski discloses the lamp comprising a catalytic material. The recitation "said catalyst is operative to increase spectral stability" has not been given patentable weight because is considered an intended use(d) recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Regarding claims 3 and 12, Yatsiv-Kaminski discloses the catalytic material disposed within the lamp envelope, but is silent regarding said catalytic material being coated on an inside wall of the envelope. However, it has been held that rearranging of parts of an invention involves only routine skills in the art. Thus, it would have been obvious to one having ordinary skills in the art the time the invention was made to coat the catalytic material on an inside wall of the lamp envelope, since rearrangement of parts of an invention is considered within the skills of the art. Further, coating said catalytic material on an inside wall reduces the number of parts of the lamp, and thus, its manufacture costs, since an additional support or member for placing the catalyst is not required.

Referring to claims 4 and 13, Yatsiv-Kaminski discloses the catalytic material consisting of platinum (see '886, Col. 2, line 36).

Referring to claims 5 and 7, claims 5 and 7 are rejected over the reasons stated in the rejection of claim 1.

Referring to claim 6, Yatsiv-Kaminski discloses the claimed invention except for the limitation of "the lamp volume being less than approximately 6 ml". However, it has been held that a change in size is generally recognized as being within the level of ordinary skill in the art. Thus, it would have been obvious to one having ordinary skill in the art to provide a lamp having a volume of 6 ml, since such a modification would have involve a mere change in the size of a component.

Referring to claims 8, 14, 15 and 16, Yatsiv discloses the IR-active gas species being carbon dioxide (see at least Cols. 3 and 4, Examples 1-4).

Regarding claim 9, Yatsiv-Kaminski discloses the claimed invention except for the limitation of "the concentration of carbon dioxide being less than 5%". However, it has been held that where the general conditions of a claim are disclosed in the prior art,

discovering the optimum or workable ranges involves only routine skill in the art. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the concentration of carbon dioxide in less than 5%, since it is generally considered to be within the ordinary skill in the art to adjust, vary, select or optimize the numerical parameters or values of any system absent a showing of criticality in a particular recited value.

Regarding claim 17, Yatsiv-Kaminski discloses the lamp comprising a catalytic material and a predetermined carbon dioxide concentration, but is silent regarding the recitation of "said carbon dioxide concentration results in increased absorption curve depth". However, it is elementary that mere recitation of a newly discovered function or property, inherently possessed by the structure of the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic *of* the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. Thus, the functional limitation *of* said carbon dioxide concentration results in increased absorption curve depth is taught by Yatsiv-Kaminski under the principles of functional inherency. "

(7) Grouping of Claims

All of the claims 1-17 stand or fall together.

(8) Arguments

The appellant believes that the Examiner is in error in a number of respects:
(a) with regard to what is shown in Kaminski et al., and
(b) with regard to the conclusions which the Examiner draws from Kaminski et al., for comparing to the present claimed invention, and
(c) with regard to the basis for combining the teachings of Yatsiv et al and Kaminski et al.

In order to present the appellant's reasons for these beliefs, the Examiner's reasons for his rejection of claims 1 and 10, are again cited below, but with underlined text to emphasize those aspects with which the appellant disagrees. The Examiner states that:

"Regarding claims 1 and 10, Yatsiv discloses a method of constructing an electrically excited gas discharge lamp (see Figs. 1, 3 and 4), comprising the steps of:

constructing a lamp envelope;

cleaning said lamp envelope; and

filling said envelope with a gas mixture comprising at least one IR-active gas species (i.e. CO_2), said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited (see at least Col. 2, lines 6-18). Yatsiv is silent regarding the limitation of including a catalytic material within said lamp.

However, in the same field of endeavor, Kaminski discloses a discharge lamp comprising a catalytic material deposited in finely divided form within the lamp envelope in order to reduce arcing between electrodes and loss in optical power, resulting from the decomposition of CO_2 into CO and oxygen (see Col. 1, lines 14-20; and Col. 2, lines 21-25, and 35-37). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the catalytic material of Kaminski in the gas discharge of Yatsiv, with the purpose of reducing arcing between electrodes and loss in optical power, resulting from the decomposition of CO_2 into CO and oxygen.

The Examiner notes that while Kaminski refers to an IR-laser, instead of an IR-lamp which provides an output characteristic of spontaneous emission to a ground state, the problem of decomposition or dissociation of CO_2 to CO and oxygen is found on both IR-sources, and thus, one of ordinary skill in the art would entertain the idea of using the teachings of Kaminski in an IR-lamp. See at least GB

Patent No.1 591 709 to Webley as evidence of the problem of CO_2 dissociation in IR-discharge lamps."

The appellant respectfully submits the following remarks regarding the above emphasized points:

A. The Examiner states that "Kaminski discloses a discharge lamp comprising a catalytic material deposited in finely divided form within the lamp envelope ......".

The appellant submits that nowhere in Kaminsky is the use of "a catalytic material **deposited in finely divided form**" mentioned or suggested.

In support of this, the appellant submits that Kaminsky refers to the form of the catalyst, *inter alia*, at the following locations:

(i) In the "Disclosure of the Invention" paragraph, col. 1, lines 48-51, Kaminsky states that "The invention relates to a sealed-off CO_2 laser, in which the CO_2 gas is maintained in purity by a solid, ambient temperature catalyst contained within a porous electrode."

(ii) In the "Best Mode" section of Kaminsky (cited by the Examiner) in col. 2, lines 21-25, Kaminsky states that "In the electrode interior, the gas comes into contact with a catalyst which is illustrated as being in the form of solid pellets, 120, th(r)ough a catalyst may also be coated on a substrate if that is found to be convenient."

(iii) Furthermore, Kaminsky states in a number of locations that the catalyst particles can be set in motion either by movement of the laser, or by pressure pulses present in the laser. From these quotations, it is clear that the Kaminsky invention is directed at the use of **solid particles** of the catalyst, even according to his suggestion in paragraph (ii) above, that the catalyst may also be "coated on a substrate". Nowhere is there mentioned or suggested in Kaminski the use of a catalytic material deposited in finely divided form, as recited in the claims of the present application.

B. The Examiner states that "Kaminski discloses a discharge lamp comprising a catalytic material deposited in finely divided form within the lamp envelope in order to reduce arcing between electrodes and loss in optical power ... Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the catalytic material of Kaminski in the gas discharge of Yatsiv, with the purpose of reducing arcing between electrodes and loss in optical power ....."

In response, the appellant respectfully submits that the clearly stated function of the catalyst in Kaminsky "in order to reduce arcing between electrodes and loss in optical power", is nowhere stated, suggested or claimed in the present application, nor is the achievement of this objective by use of a catalyst stated, suggested or claimed.

On the contrary, unlike the situation present in the prior art regarding laser discharges, where the objective of the use of a catalyst is to avoid loss of power, and where, to the best of the appellant's knowledge, no mention is made of the spectral stability of the laser emission, the objective of the use of a catalyst in the present claimed invention is specifically to ensure spectral stability. This is clearly stated in the present application on page 10, paragraph 2, lines 1-8:

> "The catalyst is chosen to ensure an equilibrium between the IR-active gaseous species and its dissociation products. In this respect, it should be noted that **unlike prior art use of catalysts in lasers**, where the catalyst is optimally operative to keep dissociation of the IR-active species to a minimum, in order to keep laser output power to a maximum, **according to the present invention, the catalyst need only maintain a constant equilibrium level of the IR-active species** in order to achieve its aim of maintaining constant self-absorption and hence constant spectral stability." (Emphasis added.)

The appellant therefore submits that the above-cited quotation from Kaminsky, which refers to keeping dissociation of the IR-active species to a minimum in order to reduce power loss, actually teaches in a completely different direction from the objectives of the present invention, which refer to maintaining a

constant equilibrium level of the IR-active species, as evident in claims 2 and 11. The appellant therefore submits that Kaminski et al., cannot properly be used in combination with any other prior art to render the present claimed invention as obvious.

C. "The Examiner notes that while Kaminski refers to (a) an IR-laser, instead of an IR-lamp which provides an output characteristic of spontaneous emission to a ground state, the problem of decomposition or dissociation of CO_2 to CO and oxygen is found on both IR-sources, and thus, one of ordinary skill in the art would entertain the idea of using the teachings of Kaminski in an IR-lamp. See at least GB Patent No.1 591 709 to Webley as evidence of the problem of CO_2 dissociation in IR-discharge lamps."

The appellant respectfully submits that although, as stated by the Examiner, "the problem of decomposition or dissociation of CO_2 to CO and oxygen is found on both IR-sources", both the nature of the problem and the objective of the solution is entirely different in IR lasers and IR discharge lamps. This is explained in detail in the specification itself, on pages 3-6 and page 10, and is summarized herewithin as related specifically to the Kaminski prior art cited by the Examiner:

There is an inherent difference between the discharge mechanism operative in lasers and that operative in discharge lamps such as those of the present claimed invention. In the case of discharge lamps, the emitted radiation is a result of non-coherent, spontaneous emission from an excited state to the ground state. No metastable states are involved in this transition scheme. In a CO_2 laser, on the other hand, such as is described in Kaminski et al., the stimulated, amplified and emitted radiation is of a wavelength associated with a metastable transition, and ground state transitions are not involved in the emission process.

This difference is significant in relation to the differences between a laser, as is described in Kaminski et al., and IR discharge lamps as described in Yatsiv et al., or in the present claimed application. In IR discharge lamps, since a high proportion

of the CO_2 molecules populate the ground level, the spontaneous radiation associated with the transition to this ground level is readily absorbed by these ground state molecules themselves, by the process known as induced- or self-absorption. The lamp itself thus operates as an absorption cell to its own emitted light as this emitted light has to pass in its path to the output window, through the lamp's own gas fill. The CO_2 emission lines are thus absorbed at their centers, and their shapes are changed by means of this self-absorption. Changes in CO_2 concentration thus affect the emission spectrum by means of this self-absorption process. The object of the presently claimed invention is specifically to prevent such changes in the emission spectrum, by the use of a catalytic material within the lamp envelope to prevent changes in self-absorption.

In CO_2 lasers, on the other hand, such as described in Kaminski et al., the self-absorption phenomenon is, for all practical purposes, virtually non-existent. In such CO_2 lasers, the stimulated emission of the laser light is produced by a decay transition from a metastable state down to a short-lived excited state. It is such a transition which produces the familiar CO_2 10.6μm wavelength radiation. Since the lasing transition is not to the ground state, the ground state molecules do not absorb the lasing transition energy, and for this reason, self-absorption is effectively non-existent in such laser discharges. Therefore, the effects of CO_2 decomposition on the spectral composition of the lasing discharge, being related to the interaction of the discharge cell both as an emitter and as an absorber of the characteristic CO_2 lines, is of minimal importance, if at all present.

Because of these differences, the appellant believes that there would **not** be motivation to one of ordinary skill in the art, to take the solution used to combat dissociation in the IR laser, and to apply it to the case of discharge lamps. In this respect, the appellant would even question the assertion of the Examiner that gas discharge lasers and gas discharge lamps are "in the same field of endeavor", despite the similarities of the dissociation phenomenon of their gases.

Even more pointedly, in the Webley discharge lamp reference, cited by the Examiner as an example of this similarity, there is no mention or suggestion that the mechanism responsible for the decay of lasing power is the dissociation of carbon dioxide to carbon monoxide. Webley describes his method as combating the "dissociation of the contained gases into their constituent elements" (p. 1, lines 14-15), which the appellant understands to mean carbon and oxygen. For this reason, in the Webley patent, the solution proposed is to include in the discharge tube a carbon filament and/or a filament acting as an oxygen generator, in order "to produce and/or regenerate the oxides of carbon" (p. 1, lines 63-64 and lines 77-81). The appellant believes that an oxidizing agent such as the potassium chlorate mentioned in Webley, would produce both carbon monoxide and carbon dioxide, thus rendering its use in combating the dissociation of CO_2 as unpredictable. Certainly, no mention or suggestion of **catalytic** action is made anywhere in Webley. Furthermore, Webley asserts that his method is also useful for combating the decay in output in carbon **monoxide** discharge tubes (p. 1, line 10, lines 11-12, line 20-21, et al.), and from his silence on the matter of the decomposition of carbon dioxide to carbon monoxide and oxygen, it is clear that his invention was not directed to solving the specific dissociation problem in carbon dioxide gas discharge lasers, which was already known at the time. Therefore, the appellant respectfully submits that the Examiner's specific use of the Webley reference to show that "the problem of decomposition or dissociation of CO_2 to CO and oxygen is found on (in) both IR-sources" is tenuous, if not outright erroneous.

Additionally, even if the teachings in the Kaminski patent relating to the type of catalyst used were considered to be similar to the teachings of the present claimed invention, a suggestion with which the appellant disagrees, the appellant submits that nowhere in the Kaminski patent is there any mention or suggestion to apply the teachings contained therein concerning catalysts, to the subject of gas discharge lamps, such as those of the Yatsiv patent. The appellant therefore respectfully submits that combination of these two references cannot therefore be used as a *prima facie* case to render the present invention as obvious.

Finally, in addition to the specific arguments presented under the above three delineated headings, A to C, the appellant respectfully submits that:

(i) the mechanism of the dissociation of CO_2 to CO and oxygen in CO_2 lasers,

(ii) the part that such dissociation plays in the loss of lasing power, and

(iii) the concomitant use of a catalyst to avoid such dissociation,

have all been known since 1971, as described in US Patent No. 3,569,857 to J. Macken. A number of other closely following patents describe similar dissociation phenomena and catalytic solutions thereto, including GB 1,256,398 also of 1971 and assigned to Elliott Bros. Ltd., GB 1,278,639 in 1972 and assigned to Ferranti Ltd., and US 3,758,876 to E. Klement in 1973. Furthermore, according to the references brought in the Background Art section of the Kaminski patent itself, the use of ambient temperature catalysts to solve the problem of the dissociation of CO_2 to CO and oxygen in lasers, and thus to prevent loss of lasing power, had been known since at least 1979 or 1980.

If, as asserted by the Examiner, the extension of the use of catalysts in lasers to their use in discharge lamps, for any function whatsoever, were indeed obvious, it is not clear why catalysts were not used in the construction of the discharge lamps described **over 20 years** later in the Yatsiv patent.

The appellant respectfully submits that the reason is that the use of catalysts in gas discharge lamps is indeed a novel and inventive idea, and that the industry had to wait for almost another **10 years** after the Yatsiv patent, until its invention by the appellant, as described and claimed in the present application.

On the basis of the above arguments, the appellant believes that none of claims 1-17 are rendered obvious by Yatsiv et al. (US 5,300,859) in view of Kaminsky et al. (US 4,547,886). Claims 1-17 are therefore believed to be free of the grounds of rejection applied under 35 U.S.C.§103(a), and to recite patentable subject matter over the prior art.

Conclusion

For all of the foregoing reasons, it is respectfully submitted to the Board of Patent Appeals and Interferences that the Examiner's rejection of claims 1-17 is erroneous. Reversal of his decision is respectfully requested.

Respectfully submitted,

S. Peter Ludwig
Registration No. 25,351
Attorney for Applicant

Darby & Darby P.C.
P.O. Box 5257
New York, NY 10150-5257
(212) 527-7700

(9) Appendix

List of claims involved in this appeal, as per 37 CFR §1.192(c)(9)

1. A method of constructing an improved, electrically excited, gas discharge lamp, comprising the steps of:

constructing a lamp envelope;

cleaning said lamp envelope; and

filling said envelope with a gas mixture comprising at least one IR-active gas species, said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited;

the improvement being the additional step of including a catalytic material deposited in finely divided form within said lamp envelope.

2. The method according to claim 1, wherein said catalytic material is operative to increase the spectral stability of said lamp by reducing changes with time in the level of self-absorption in said gas mixture.

3. The method according to claim 1 wherein said catalytic material is coated on an inside wall of said envelope.

4. The method according to claim 1, wherein said catalytic material is chosen from a group consisting of gold, silver, rhodium, iridium, palladium, platinum and nickel.

5. A method of constructing an improved electrically excited gas discharge lamp, comprising the steps of:

constructing a lamp envelope;

cleaning said lamp envelope; and

filling said envelope with a gas mixture comprising at least one IR-active gas species, said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited;

the improvement being the additional step of including a catalytic material deposited in finely divided form within said lamp envelope, such that the volume of said lamp can be decreased.

6. The method according to claim 5, wherein said lamp volume is approximately 6 milliliters.

7. A method of constructing an improved electrically excited gas discharge lamp, comprising the steps of:

constructing a lamp envelope;

cleaning said lamp envelope; and

filling said envelope with a gas mixture comprising at least one IR-active gas species, said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state when electrically excited;

the improvement being the additional step of including a catalytic material deposited in finely divided form within said lamp envelope, such that the IR-active gas concentration can be decreased.

8. The method according to claim 1 wherein said IR-active gas species is carbon dioxide.

9. The method according to claim 1, wherein said IR-active gas species is carbon dioxide and the concentration of said carbon dioxide is less than approximately 5%.

10. An electrically excited gas discharge lamp, comprising:

a lamp envelope containing a gas mixture comprising at least one IR-active gas species;

electrodes external to said envelope for exciting said at least one IR-active gas species, said gas species being such that said lamp provides an output characteristic of spontaneous emission to a ground state; and

a catalytic material deposited in finely divided form located within said lamp envelope.

11. The lamp according to claim 10, wherein said catalyst is operative to increase the spectral stability of said lamp by reducing changes with time in the level of self-absorption in said gas mixture.

12. The lamp according to claim 10, wherein said catalytic material is coated on an inside wall of said envelope.

13. The lamp according to claim 10, wherein said catalytic material is chosen from a group consisting of gold, silver, rhodium, iridium, palladium, platinum and nickel.

14. The lamp according to claim 10, wherein said IR-active gas species is carbon dioxide.

15. The method according to claim 5 wherein said IR-active gas species is carbon dioxide.

16. The method according to claim 7 wherein said IR-active gas species is carbon dioxide.

17. The method according to claim 9, wherein said decreased concentration of said carbon dioxide is such that the self-absorption of said lamp is reduced, resulting in increased absorption curve depths in a gas analyzer utilizing the emission spectrum of said carbon dioxide.